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A NEW SOMATOCHLORA, WITH A NOTE ON THE SPECIES KNOWN FROM ONTARIO.

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In my "First List of Ontario Odonata" (CAN. ENT., XXXVIII, 1906, p. 151), I recorded *Somatochlora elongata* (Scudd.) from Toronto, De Grassi Point (Lake Simcoe) and Algonquin Park, and remarked upon the fact that the superior appendages of the male were more incurved in the examples from Toronto and Lake Simcoe than in those from Algonquin Park. A further study of these specimens revealed other marks of distinction, and led me to the conclusion that the two forms were specifically distinct, those from Algonquin Park belonging to true *elongata*, while the others represented a closely allied but apparently undescribed species. Mr. E. B. Williamson, to whom I sent sketches of the abdominal appendages of both forms, wrote that he had also taken them both, and was likewise of the opinion that the species in question was new. Dr. Calvert, to whom I sent a specimen, expressed the same opinion, and added that he had a pair of the same form from Sherbrooke, Que., taken by L'Abbé Begin. Since then I have examined these specimens myself.

I also learned through Mr. Williamson that the description of the nymph of *elongata*, as given by Prof. Needham (Aquatic Insects in the Adirondacks, Bull. 47, N. Y. State Mus., 1901, 499), probably belongs to the same new species. I have one of Needham's specimens from the same locality before me, and it is certainly identical with my other specimens. Needham's figures of the appendages are from specimens in the Museum of Comparative Zoology, Cambridge, Mass., and are those of true *elongata*.

Somatochlora Williamsoni, sp. nov.

1901. *Somatochlora elongata*, Needham, Aq. Ins. in the Ad., Bull. 47, N. Y. State Mus., 499.

1906. *Somatochlora elongata*, Walker, CAN. ENT., XXXVIII, 151.

Closely related to *S. elongata* (Scudd.), with which it agrees in size and proportions, but differs in the form of the superior abdominal appendages of the ♂ and in certain details of colour pattern.

Vertex very dark metallic green, evenly punctate. Frons above and in front dark metallic greenish-blue, bordered below and at the sides by a brownish-yellow band. The dark area, except a narrow median smooth space at the bottom of the depression above, is rather coarsely and irregularly pitted and covered by dark brown pile, while in the lighter yellowish parts the pits are much finer and the pile, as elsewhere in the face, paler. Anteclypeus and labrum pale yellow; postclypeus reddish- or yellowish-brown, generally much darker in its middle part, but not forming as distinct a dark band between the lighter parts above and below it as it does in *elongata*, in which the middle portion and sometimes the entire postclypeus forms a strong dark brown or black band between the paler parts of the frons and anteclypeus. Labrum black. Occiput shining reddish-brown, well rounded behind, bearing dense dark brown hairs above, pale brownish ones behind. Posterior surface of head shining black, with a submarginal dense row of long pale brownish hairs in line with those of the occiput.

Prothorax black, anterior lobe broadly margined with very pale yellow, posterior lobe dull metallic bronze-green, with pale brownish hairs, convex behind. Meso- and metathorax dull metallic green, with blue or violet-blue reflections, especially upon the epimera, covered with long pale yellowish-brown hairs, except upon the antealar sinus, where the hairs are dark brown, very short and denser than elsewhere. A few black hairs also about the bases of both pairs of wings. A dull yellow mesepimeral band usually 4-6 times as long as broad, and an elongate-oval metepimeral spot of the same colour. These markings may be very inconspicuous in old examples. Under parts of thorax pale yellowish brown. Legs black with the following parts yellowish-brown: the coxæ, or greater part of them, first and upper surface of second trochanters, first femora, except near the knees and sometimes the under surface, upper surface of second femora except distally.

Abdomen slightly more than $2\frac{1}{2}$ times as long as head and thorax, tumid at base, narrowest before middle of 3, thence expanding to apex of 5, where width about equals base of 2, sides of 6 parallel, remaining segments very gradually narrowing. Colour dull dark bronzy-green, covered with fine short pale brownish hairs; sides of 2 and base of 3 shining dark brown with conspicuous pale brownish hairs, genital lobe black. A brownish yellow band on lateral surface of 2 in its lower half, passing just above genital lobe, where it is generally constricted and often

divided into two spots and continued posteriorly as a ventro-lateral triangular spot on base of 3. Dorsum of 2 with a yellowish spot on each side distally, followed on dorsum of 3 by a smaller and sometimes obsolete basal spot which is often connected below with the ventro-lateral spot of the same segment.

Superior appendages black, about as long as 9 + 10, separated at their origin by a space about equal in width to base of one of the appendages; the latter broadest at base, becoming narrower and somewhat incurved in proximal fourth, where both margins as seen from above are gently concave; middle third gradually approaching middle line, somewhat tumid and rounded, with sides parallel; distal third very slightly tapering, bent inwards, forming an angle of about 40° with its fellow of the opposite side. Viewed from the side they appear distinctly but not strongly arched, with the apices strongly upturned and ending in a recurved point. The outer margin is bent downwards and bears a large but obtuse basal tooth, usually followed before the middle by another very inconspicuous one, after which it fades into the rounded lateral surface. Both teeth are usually visible from above. Ventral surface concave at base, beyond rounded and somewhat tumid. A slight ridge passes from the concavity obliquely backwards and inwards, forming a prominence which appears as a very obtuse and rounded angle when viewed from the side, thence continued as the slightly angular inner margin. The hairs on distal half above are long and dense, being much longer than depth of appendage.

Inferior appendage about half as long as superiors, triangular, about $\frac{2}{3}$ as broad at base as long, sides slightly convex, apex rounded, lateral surfaces sulcate; in profile view it forms a shallow curve with the concavity upwards, the upper and lower margins nearly parallel, apex surmounted by a short recurved tooth.

♀ differs from ♂ in markings as follows: The ventro-lateral spot on 2 is unbroken, well-defined above, but fades below into the dull yellowish brown which covers most of the ventral surface of 2 and 3. Dorsum of 3 is broadly margined with brownish yellow, most conspicuous on proximal half, and continued as a less distinct elongate spot on basal third of 4. Indistinct spots of same colour occupy antero-lateral angles of 5, 6, 7 and 8. Abdomen broadest at middle of 2, where it is about twice as broad as at base of 9, tapering equally to middle of 9, whose sides diverge in distal half so that breadth at apex is about $\frac{1}{4}$ greater

than at base. Apex of 10 nearly equal to base of 9. Ventro-lateral margins of 8, 9 and 10 and ventral surfaces of 9 and 10 yellowish, vulvar lamina rather longer than depth of 8 at apex, spout-shaped, elongate triangular in profile, with ventral surface slightly concave, apex rounded.

Appendages $\frac{1}{2}$ longer than 9 + 10, black, evenly covered with short hairs, slender, subcylindrical, slightly bent inwards in proximal half, enlarging distally its proximal two-thirds, thence narrowing again very slightly, apex rounded. A slight carina runs along outer ventro-lateral margin in its proximal half.

Wings (δ φ) hyaline, yellow at base in φ , becoming somewhat suffused with brownish in old examples, venation black, pterostigma dark brown.

Front-wings: Antecubitals 7-8, postcubitals 5-9, usually 7; triangles 2-celled, internal triangles 3-celled, one submedian cross-vein on a level with the first antecubital; 3 post-triangular cells, followed by 2 rows of cells to near the level of separation of the median and principal sectors, then 3 rows; generally 4-5 cells at the margin; membranula sooty-gray.

Hind-wings: Antecubitals commonly 5, sometimes 6, postcubitals 6-10, generally 7-9; triangles 2-celled, internal triangles free, one other submedian cross-vein before the level of the first antecubital; 3 post-triangular cells (1 φ has 2 on one side, 4 on the other) followed by 2 very short rows of cells, then 3 rows which divide and subdivide until at the margin there are 9-12 cells; anal triangle of δ 2-celled; membranula sooty-gray, paler towards base, the pale area usually confined to a small spot at the immediate base, but sometimes diffused over the basal half.

Dimensions: Abdomen (incl. apps.) δ 41-45, φ 45.5-46; sup. apps. δ 4, apps. φ 4.5-5.25; hind-wing δ 37-40, φ 39-40; pterostigma 2.6-3; hind femur δ 8.5-9, φ 8-8.5 mm.

This species is most nearly related to *S. elongata* (Scudd.), from which it differs chiefly in the superior appendages of the male. In *elongata* these appear, when viewed from above, slenderer, straighter and more regular in outline. The proximal half is slightly bent inwards, but in the distal half they are parallel, with the apices well separated. The basal tooth is much smaller than in *Williamsoni*, and invisible from above, while there is no second tooth before the middle. On the other hand the carina on the under surface is much better developed, beginning as a prominent tooth, where in *Williamsoni* only a rounded eminence occurs. In profile

the appendage is less arched and the apices not so strongly recurved. The hairs on the upper surface are shorter and not so dense. The inferior appendage is a little more than half as long as the superiors. *Elongata* also differs in the much brighter and better defined yellow markings on the sides of the thorax and second abdominal segment, which, however, have much the same form and distribution. The brown of the legs is reduced to the coxæ and a streak along the proximal half or more of the upper surface of the first femora.

The dorsal view of the ♂ appendages is in some respects more like that of *S. minor*, Calv., but the superiors in the latter are relatively shorter, more slender, and are more widely separated at base, the apices are not so much upcurved and the hairs are much shorter and more thinly and evenly distributed. The basal tooth is smaller and the inferior carina bears a prominent tooth as in *elongata*.

Of European species *Williamsoni* comes nearest to *S. flavomaculata* (Lind.), but differs from it quite obviously in both appendages and colour-pattern.

Described from 10 ♂♂, 3 ♀♀. Toronto, June, 1901, 1 ♂ in house; De Grassi Point, Lake Simcoe, Ont., June 29–Aug. 1, 5 ♂♂, 3 ♀♀; Temagami, Ont., Aug. 15, 1906, 1 ♂ (P. Hahn.); Oden, Mich., Aug. 11, 1906, 2 ♂♂ (E. B. Williamson); Bone Pond, Saranac Inn, N. Y., July 26, 1900, 1 ♂ (J. G. Needham).

The known range of this species, including the Sherbrooke record, is thus from Quebec and north-eastern New York to northern Ontario and Michigan. It belongs, apparently, to the Canadian and Transition Zones, being evidently rare at Toronto, which lies towards the southern boundary of the Transition Zone, but much more numerous northward.

I take pleasure in naming this insect after Mr. E. B. Williamson, who has shown me many favours of late and given me a great deal of valuable advice and assistance in my studies of dragon-fly life.

He writes me that his specimens were taken about 4 p. m. on Aug. 11, 1906, "at the mouth of the Minnehaha, a small stream flowing into Crooked Lake, Oden, Michigan. The Minnehaha, as it approaches Crooked Lake, pursues a circuitous course through a large prairie-like and marshy tract. The *Somatochloras* were observed feeding along the shore line among the rank cattail or *Sparganium* growth just at the water's edge. They were leisurely in their movements, spending much time at a place,

before rising slightly and moving to another location. Earlier in the day a *Somatochlora* (?) of similar size was seen over a clearing near the lake, flying at an average height of possibly 20 feet."

At De Grassi Point, Lake Simcoe, they are quite numerous during the latter part of June and July, and are occasionally met with in August. Here they frequent woodland roads and glades, where I have most often seen them late in the afternoon, hovering in the sunshine in the manner described by Mr. Williamson, sometimes in considerable numbers. They seldom descend within reach of the net, however, flying usually at a height of 20-30 ft., the height increasing as evening advances and the shadows creep up the trees. They disappear at sundown. I have also occasionally seen them flying comparatively low over an open marsh at the mouth of a broad, sluggish, weed-grown creek, in which the nymphs probably breed, as it is the only suitable-looking place in the vicinity.

Since my list was published I have added another species of *Somatochlora*, *S. Walshii* (Scudd.), to the Ontario fauna, and Mr. Williamson has taken a number of specimens of *S. elongata* (Scudd.) at Hayden's, Algoma. So that the Ontario records for this genus now stand as follows:—

S. elongata (Scudd.) Algonquin Park, Hayden's, July 31, 1906.

S. Williamsons, n. sp. Toronto, L. Simcoe, Temagami.

S. Walshii (Scudd.) De Grassi Point, Lake Simcoe, Aug. 7, 1906;

1 ♂ flying leisurely over field near edge of wood.

S. forcipata (Scudd.) Algonquin Park.

S. tenebrosa (Say.) Hamilton (?)

Several other species will be sure to appear in the north.

EXPLANATION OF PLATE 2.

Fig. 1. *Somatochlora Williamsons*, n. sp.—Lake Simcoe, Ont., dorsal view of ♂ abdominal appendages; 1a, lateral view of same; 1b, dorsal view of ♀ appendages; 1c, lateral view of same.

Fig. 2. *S. elongata* (Scudd.)—Algonquin Park, Ont., dorsal view ♂ appendages; 2a, same, lateral view.

Fig. 3. *S. minor*, Calv.—Type specimen, Franconia, N. H., dorsal view ♂ appendages; 3a, same, lateral view.

NEW GENERA AND SPECIES OF DIPTERA.

BY D. W. COQUILLETT, WASHINGTON, D. C.

CONDIDEA, new genus of Syrphidæ.

Near *Helophilus*, but the antennal arista is plumose, the eyes contiguous in the male, etc. General aspect of a species of *Didea*. Head in profile very similar to that of *Sericomyia militaris* (Williston's Synopsis N. Am. Syrphidæ, Plate VII, fig. 36), except that the face is somewhat shorter; antennæ as in that figure except that the third joint is subquadrate, with rounded angles; body almost bare, abdomen noticeably wider than the thorax, subovate, greatly depressed; legs unarmed, femora not thickened; venation of wings as in *Helophilus conostomus* (Williston, l. c., Plate VIII, fig. 3a). Type, *Condidea lata*, new species.

This interesting form is practically a *Sericomyia* with a pediform first posterior cell; it thus forms a connecting link between the tribes Sericomynini and Eristalini.

Condidea lata, new species.—Black, the thorax tinged with bronze, the face and cheeks except a stripe extending from each eye to the oral margin, the lower edge of the front and of the occiput, a pair of spots on abdominal segments two, three and four, also the venter except apically, light yellow, apex of abdomen reddish; wings hyaline, stigma yellowish brown. The yellow spots on the abdomen do not touch the lateral margin; the first pair is very large and nearly circular; second pair less than half as large, the outer posterior angle of each spot almost cut off by the black ground colour; the third pair is much the smallest, each spot reniform and placed obliquely. Length, 15 mm.

North Saugus, Mass. A male specimen collected by Mr. F. H. Mosher. Type No. 10156, U. S. National Museum.

ACHÆTOMUS, new genus of Helomyzidæ.

Near *Helomyza*, as restricted by Loew, but with only two pairs of dorsocentral bristles, propleural present, two pairs of fronto-orbitals, etc. Eyes circular, cheeks nearly as wide as the eye-height, third joint of antennæ broader than long, arista dorsal, bare. Femora without bristles, tibiæ with apical and pre-apical bristles only. Venation as in *Helomyza*, spines of costa well-developed. Type: The following species:

Achatomus pilosus, new species.—Reddish brown, the scutellum and legs yellow, bases of abdominal segments three to five dark brown, hairs and bristles black. Hairs of cheeks covering their lower half, no bristles near vibrissæ. Pleura almost wholly covered with hairs except the portion

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posterior to the sternopleura, one sternopleural bristle, no other pleural bristles present; scutellum without hairs, four scutellar bristles. Wings hyaline, unmarked except the extreme base and the stigma, which are yellowish. Length, 8 mm.

North Saugus, Mass. A male specimen collected by Mr. H. M. Russell. Type No. 10157, U. S. National Museum.

OMOMYIA, new genus of Phycodromidæ.

Near *Coelopa*, but very hairy and having the scutellum greatly elongated, etc. Eyes ovate, longer than high, cheeks about as wide as the eye-height, no vibrissæ, face straight, with a high median carina which is prolonged upward between the bases of the antennæ: antennæ nearly as long as the face, the first joint minute, the second as wide as long, the third ellipsoidal, nearly twice as long as wide, arista bare, thickened on the basal fourth, the first joint as long as wide, the second nearly twice as long, arista inserted near the base of the dorsal edge of the third antennal joint; front sparsely covered with long hairs, from which the usual bristles, except the ocellars, are not distinctly differentiated; occiput strongly convex. Thorax bearing one pair of dorsocentral bristles, two supra-alar, one notopleural, one mesopleural, one propleural, and one sternopleural bristle. Scutellum bare, nearly one-half as long as the mesonotum, its sides emarginate, its apex subtruncated, two pairs of long lateral bristles. Abdomen narrower than the thorax, elongate ovate, somewhat depressed. Legs rather short and robust, without bristles, except on the middle tibiæ, which are fringed along the outer side besides bearing several at the apex, a stout bristle at apex of inner side of each hind tibia, under side of tarsi beset with short spines, first tarsal joint longer than any of the following joints. Venation complete, auxiliary vein present, contiguous with the first, except toward its apex, costa beset with short spines, sixth vein prolonged to the wing-margin, last section of the fourth vein parallel with the third, first vein distinctly dilated before its apex. Type, the following species:

Omomyia hirsuta, new species.—Yellow, a tridentate spot on upper half of occiput, prolonged to include the ocelli, the thorax, except the lateral margins and several spots on the pleura, the base of scutellum and a crossband on each segment of the abdomen, black; hind femora sometimes partly brown; thorax opaque, gray pruinose, abdomen polished; hairs mixed, black and yellow; wings hyaline, a circular brown cloud just before apex of second vein. Length, 5 mm.

Lancaster, California. Eight specimens collected in April, by Mr. A. Koebele. Type No. 10158, U. S. National Museum.

NEW MICRO-LEPIDOPTERA.

BY W. D. KEARFOTT, MONTCLAIR, N. J.

(Continued from page 60.)

Evetria Siskiyouana, sp. nov.

Head pale ochreous, a dash of dark brown behind antenna and a darker shade above eye; palpi pale ochreous within, dark brown outside, changing to black at apex; antenna smoky-black, whitish between joints, basal joint ochreous-brown; abdomen brownish-fuscos; legs ochreous-white, heavily shaded and banded with blackish-brown.

Fore wing evenly spotted with grayish-ochreous; the margins of the spots are usually shining, and are frequently overlaid with ochreous and ochreous-brown. They are separated by irregular horizontal and vertical black lines. There are four to five irregular vertical rows of spots; where each touches the costa they usually do so as a geminate spot, enclosing a dot of dark brown. Terminal line dark brown, preciliate line black, inwardly edged with whitish, cilia leaden-gray, cut by two dashes of whitish beneath apex.

Hind wing smoky-brown, cilia dark gray; under side dark brown, clouded with whitish, with dark brown spots on costa before apex and terminal line of same colour below apex. Under side fore wing smoky-brown, with dark brown costal spots, separated by cream-white. The description is of the Siskiyou specimen; the one from Oregon is darker, head and palpi dark gray and brown, the spots on fore wing are more overlaid with brown, especially on upper half; but I do not believe they are other than local races of the same species.

Expanse, 21-22 mm.

Two ♂ specimens: Siskiyou Co., California; Oregon, Koebele; both from U. S. Natl. Mus. collections.

Co-type U. S. Natl. Mus.

The larvæ of this species are probably borers in the twigs or cones of *Conifera*.

Eucosma Denverana, sp. nov.

Head and palpi cream-white, the latter a shade darker outwardly and below; antenna cream-white; thorax light brown, finely speckled with white; abdomen and legs creamy-white, latter dusted with dark brown.

Fore wing light brassy-brown, speckled evenly all over with white scales, a darker shade on costa at base, and a faintly darker shade on

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inner fourth of dorsum. Cilia very pale fuscous-brown, heavily dotted with whitish scales, with an indistinct darker line at base.

Hind wing light smoky-brown, long hairs at base yellowish, cilia whitish, with a darker basal shade; under side the same, but whiter below middle of wing. Under side fore wing brassy-gray, white below fold, cilia white.

Expanse, 24-28 mm.

Five specimens, all Denver, Colo., four from Dr. Barnes's collection, received from U. S. Natl. Mus., and collected by E. J. Oslar; one collected by Dyar and Caudell.

Eucosma tomonana, sp. nov.

Head, palpi, antenna and thorax hoary-gray; abdomen and legs light cinereous-gray, latter dusted with coppery-brown.

Fore wing hoary-gray, with two blackish-brown dorsal spots. Even under a lens the ground colour is almost uniform, with but very faint strigulations. The costa is streaked with long lines of grayish-brown; one from just beyond middle goes to anal angle, beyond this is a short dash, then a longer line that curves outwardly and ends in middle of termen, enclosing the rounded ocellic area; between the latter line and apex are two shorter lines that join beneath costa, and continue as a single line to termen beneath apex. The gray ground separating these faint brown lines is slightly shining, and on the costa, in each of the gray interspaces, is a narrow darker dash. Below the middle the ocellic area is shining gray, in which are a few horizontal black dashes. The dorsal spots are very conspicuous on the light ground colour; the inner is a flattened triangle with narrow base, on inner third of dorsum; it curves obliquely outward, the upper end, as a fine line, reaching middle of wing; the outer spot is ovate, with its broadest and flat side between outer third of dorsum and anal angle; it does not extend beyond lower fourth. Cilia speckled gray.

Hind wing light smoky-gray, paler beneath costa, cilia whitish-gray; under side the same, faintly reticulated at outer end. Under side fore wing smoky-fuscous, whitish beneath fold.

Expanse, 12-15 mm.

Eight specimens, Montclair and Essex Co., Park, N. J., Light Trap, Aug. 21 to Sept. 11; one specimen, Westmount, Quebec, Canada.

Eucosma gomonana, sp. nov.

Head and palpi whitish-gray, latter a shade darker outside; thorax whitish-gray, mottled with darker gray, ends of patagia white; antenna

whitish-gray; abdomen light cinereous, upper side of middle segment gray, anal tuft yellowish; legs whitish, dusted with dark brown.

Fore wing fuscous-brown, crossed by shining gray fasciæ. The dark basal area on dorsum extends to inner third, goes slightly outward to middle, then inward to inner fourth of costa; it is somewhat mottled with lighter scales, which form an abbreviated fascia on the dorsal half. Beyond is a broad shining gray fascia, divided vertically by a fine line of brown, and on upper half of wing each side is subdivided by a brown line from costa; its outer edge is slightly convex between costa and fold, widening below fold to dorsum, which it reaches just before anal angle. Beyond is a narrow fascia of brown, beginning as a line from costa and ending at anal angle, where it is half the width of the preceding gray fascia, and of about equal width to a gray fascia which follows it; the latter begins as a geminate spot on outer third of costa, it is slightly constricted at upper third; the ground colour on either side of its lower half contains a few black scales. Following is a broad brown spot on costa, diminishing to a line below middle and ending in lower third of termen. Before the apex is a broad gray costal spot, which curves into termen below apex, on its lower edge it connects with a gray spot in the ocellic area. The apical spot is brown, and a streak of the same colour runs before termen to anal angle. Cilia dark gray, with a darker basal line, which is followed by a thin whitish line.

Hind wing light grayish-brown, cilia whitish, with a darker line near base; under side the same. Under side fore wing smoky-black, gray below fold.

Expanse, 8-11 mm.

Twenty specimens: Essex Co. Park and Watchung Mountains, Essex and Passaic Counties, New Jersey, April 20 to May 15.

Eucosma domonana, sp. nov.

Head, palpi, thorax and antenna light cinereous-gray; abdomen beneath and anal tuft same colour, above leaden-gray; legs ringed and dusted with bronzy-brown.

Fore wing bronzy-brown, finely speckled with whitish-yellow; the few spots and fascia are of the ground colour, with the whitish scales absent. There is a dark spot between fold and dorsum before middle; a narrow dark fascia from middle of costa to anal angle, three dark costal spots between the fascia and a dark spot in apex; between each two of the costal spots is a yellowish-white geminate dash. The terminal line is

black, bordered by a broader brown streak below the middle; the terminal line is cut by two white dashes below apex; there are two similar whitish dashes, one above and one below the anal angle, but they do not cut through the terminal line. Between the inner dark spot and the fascia, in the lower half of wing, the whitish specks are somewhat thickened, making a paler middle dorsal patch. Cilia dark gray, paler at base.

Hind wing smoky-brown, cilia same, with a paler line at base; under side both wings the same, with whitish costal dashes repeated on upper wing.

Expanse, 11-12 mm.

Two specimens, Framingham, Mass., June 10, C. A. Frost.

Eucosma zomonana, sp. nov.

Head and palpi cinereous-brown; antenna grayish-white; thorax cinereous-brown, whitish on posterior end and patagia; abdomen grayish-brown, anal tuft yellowish; legs gray, thickly dusted and banded with brown.

Fore wing shining gray, with an outwardly oblique dark brown fascia from inner third of dorsum to middle of wing, a long, outwardly convex brown fascia from between inner third and middle of costa to anal angle; the lower half is much darker than the upper; a brown shade from end of cell into apex, flatly triangular, the points being at end of cell and apex and the flattened base uppermost; the inner end sometimes connects with the dark spot of the dark fascia; this shade and the dark spot define inwardly and above a shining whitish-gray ocellic spot, in the middle of which are two or three horizontal dark brown lines. From outer third of costa are several shining whitish-gray oblique streaks; in the lightest specimens the streak before the apex cuts through the dark shade. The termen is bordered by a whitish-gray fascia. Cilia paler, shining gray.

Hind wing smoky-gray, cilia lighter, preceded by a darker basal line; under side the same; under side fore wing darker.

Expanse, 11-15 mm.

Five specimens: New Brighton, Beaver Co., Penna., May 22 to June 6, and Aug. 23 to Sept. 14, F. A. Merrick. One of these specimens was identified at the U. S. National Museum, for Mr. Merrick, as *E. abbreviatana*, Wlsm., and one as *E. solicitana*, Walk., but they do not resemble either of these species.

Epinotia Watchungana, sp. nov.

Head blackish-brown on sides and face, whitish-gray on top; palpi whitish-gray, streaked with blackish-brown outside above, and speckled with same colour below; apical joint black outside, with a grayish bloom within; antenna brownish-gray; thorax mottled whitish-gray and blackish-brown; the base of patagia is dark and a dark spot before the whitish end of posterior tuft, a fine dark median line; thorax light brown, with overlapping rings of whitish scales; legs whitish, banded and dusted with bronzy-black.

Fore wing mottled light fuscous gray and black, the latter partly of a brownish tinge. The most conspicuous mark is the ocellus, which is large, rounded, and occupies the lower two-thirds of the outer fourth; it is grayish-white, vertical side bars shining, and is crossed by four or five horizontal short black lines. Below the apex on costa is a V-shaped whitish mark that connects with a geminate whitish dash in termen and cilia below apex, below costa this mark is shining; it encloses a rounded pale brown, overlaid with fine black lines, apical spot. The costa from base to apex is marked with black and whitish spots and dashes, usually geminate; from a larger one beyond the middle a black line runs beneath the outer costal spots, turning down below apex and merging in a pale brown streak, overlaid with fine black lines, that lies between upper edge of ocellus and termen. On the middle of dorsum there is an oblique whitish patch reaching above fold, but not to middle; it is streaked with darker lines. Before this is a strong black shade, which on inner side obscurely connects with a circle of black scales on lower half of wing close to base. The extreme dorsal edge is gray, dotted with black. A brownish streak runs from outer third of costa to anal angle. Cilia at apex whitish, below the geminate dashes gray finely speckled with black.

Hind wing whitish except around apex and termen, dark gray, cilia white, with a darker line near base; under side whitish, with a few dark specks along costa. Under side fore wing smoky-brown, with costal spots and ciliate dashes repeated.

Expanse, 12-16 mm.

Thirty-five specimens, nearly all from Watchung Hills, Essex Co., N. J., April 21 to May 8; Gloucester Co., N. J., April 30, F. Haimbach; Grimsby, Ont., J. Pettit; New Brighton, Pa., Mar. 22-April 18, F. A. Merrick; Cincinnati, Ohio, April 22, Miss Braun.

Co-type in U. S. Natl. Mus.

Tortrix Baboquavariana, sp. nov.

Head, palpi, antenna and thorax shades of ochreous-brown and yellowish-ochreous; abdomen grayish-fuscos above, pale ochreous on side and anal tuft; legs pale ochreous.

Fore wing light yellowish ochreous, somewhat shining and with a slight pinkish tinge; marked with well-defined ochreous-brown spots and narrow fasciæ; these are usually edged with darker brown, and occur as follows: A crescentiform fascia from lower half of base to above middle of wing, extending outward to inner fourth. A narrow diminishing fascia from middle of costa obliquely outward towards lower side of termen, but at lower quarter turning downward and reaching dorsum before anal angle. On the middle of dorsum is a large rounded spot, reaching nearly to middle of wing; in some specimens a spur from its upper end connects with the angle of the fascia. From costa before apex a fascia, slightly curving inward, ends at lower third of termen. The inner fourth of costa is shaded with dark brown, and a spot of same colour occurs in second quarter, also a dot of the same colour between the two fasciæ. There are a few dark scales before the apex. Cilia concolorous, dotted with brown.

Hind wing olivaceous-fuscos, with a fine yellowish terminal line, whitish above cell, cilia grayish-white; under side grayish-white; under side fore wing darker gray, with spots faintly repeated, cilia light ochreous.

Expanse, 9-10 mm.

Four specimens: Baboquavaria Mts., Pima Co., Arizona, July 15-30, 1903, collected by O. C. Poling.

Tortrix lomonana, sp. nov.

Head smoky-brown, antenna base black; palpi smoky-brown outside, cream colour inside, apical joint black; antenna yellowish-white; thorax black, transversely streaked with white; abdomen and legs light ochreous, latter banded with blackish-brown.

Fore wing: Basal area and a large median costal spot dark fuscous, dotted with black, gray and whitish scales; an oblique middle fascia and large ovate terminal spot white. The outer edge of basal area starts at inner fourth of costa, proceeds obliquely outward to middle of wing, then nearly straight to dorsal margin between inner third and middle; the edge is very finely dentate. The outer dark spot is roughly triangular, on costa it extends from middle to outer seventh; its inner edge is parallel with upper half of basal edge; its lower point is about one-fifth above dorsum and nearly opposite anal angle; the outer edge curves inward at middle

of wing, and the spot is crossed by a line of ochreous-yellow, over which are a few black scales. The upper half of the middle white fascia is rather heavily reticulated with fuscous and dirty white, the former colour starting as three streaks from costa. The outer white patch connects the fascia below the triangular dark spot; it is marked with a few black dots on dorsum, and a streak of faint yellowish scales before the termen. There is a black terminal line, cut by two white dashes below apex, that ends above anal angle. Cilia white, outwardly tipped with fuscous.

Hind wing whitish, reticulated with very light fuscous; under side the same. Under side fore wing smoky-black, paler on costa and dotted with black.

Expanse, 18-19 mm.

Two specimens, Victoria, B. C., Oct. 2, Dr. Wm. Barnes's collection, received through U. S. Natl. Mus. One co-type returned to Natl. Mus.

Phalonia romonana, sp. nov.

Head bleached straw-yellow, faintly darker on sides; palpi same colour, shaded with light brown outside; antenna light gray-fuscous; thorax a shade darker than head; abdomen dark gray, anal tuft tipped with yellowish; legs bleached straw, shaded with blackish-brown.

Fore wing; an inner and outer fascia of shining light pinkish-yellow; a basal patch, central fascia and terminal fascia of dullolivaceous-ochreous. The basal patch extends to inner fifth on costa and dorsum, its edge is irregular but nearly straight, close to base it is overlaid with shining scales. The four fasciæ beyond it are of nearly equal width and nearly parallel edges; the divisional lines are oblique from costa inward, and curved outwardly below costa. There is a conspicuous patch of black scales from end of cell at middle, along outer edge of middle fascia to below fold, with a line of black across fascia, in fold. Beyond this black patch a streak of the dull colour crosses the outer shining fascia, obliquely to anal angle. The dorsal margin is dotted with black between inner fourth and outer fifth. The inner third of costal edge is black, also above the middle fascia, and with two black dots above the outer fascia; there are one or two black dots before termen in middle of wing. The terminal dull fascia is outwardly streaked with shining lines. Cilia concolorous, shining.

Hind wing purplish-gray, cilia whitish; under side paler gray, lightly reticulated with darker lines below costa and before termen. Under side fore wing dark purplish-gray, spotted with dull ochreous on costa, cilia dull ochreous, divided by a broad purplish line.

Expanse, 7.5-11 mm.

Thirty specimens : Essex Co., Park, N. J., August 13 to Sept. 17, Light Trap ; Chicago, Ill., Sept., J. H. Reading ; Aweme, Manitoba, July 5, Norman Criddle ; Plummer's Island, Md., August, A. Busck.

Co-type in U. S. Natl. Mus.

Phalonia nomonana, sp. nov.

Head and palpi dirty white, latter brownish outside ; thorax gray and brownish-black ; antenna fuscous, basal joint blackish-brown ; abdomen and legs yellowish-white, latter heavily powdered with leaden-black.

Fore wing shining brownish-gray. There is a broad central semi-fascia, with parallel edges from inner third of dorsum to upper edge of cell, outwardly oblique, and indented on upper edge outside, colour blackish-brown. This is the only conspicuous mark on the wing. The costa from base to outer third is a darker shade and closely dotted with black ; between outer fifth and apex are three or four darker dots. The dorsum is dotted with small blackish spots. There is an obscure streak of reddish-brown from beyond middle of cell to anal angle. There is a blackish narrow terminal line, with a few dark dots before it in the middle of wing. Cilia concolorous, divided by a darker middle line.

Hind wing shining light gray, cilia same, with a darker line near base ; under side the same, lightly reticulated before apex. Under side fore wing shining smoky-black.

Expanse, 15 mm.

One ♂ specimen, Carmel, California, April, A. H. Vachell.

Hysterosia homonana, sp. nov.

Head, palpi, thorax and antenna cream-white, outside of palpi, base and upper side of antenna brown. Abdomen and legs light cinereous, latter shaded with brown.

Fore wing : Male costal fold brown ; balance of wing creamy-yellow, very sparsely dotted with light brown, and strigulated in outer third with shining white ; between these lines the ground colour is a shade darker than on inner half of wing. A purplish-black dot in middle of wing at end of cell. Cilia concolorous. In several specimens the light brown specks are entirely wanting, the wing is immaculate except the brown costal fold, the discal dot and the shining strigulation beyond cell.

Hind wing very light yellowish white, lightly strigulated in some specimens ; under side the same. Under side fore wing smoky-brown, costal edge and cilia light ochreous.

Expanse, 19-23 mm.

Twenty-three specimens, Verdi, Nev., June, all collected by Arthur H. Vachell.

(To be continued.)

PRACTICAL AND POPULAR ENTOMOLOGY.—NO. 19.

HOW INSECTS ARE DISTRIBUTED.

BY L. CAESAR, ONTARIO AGRICULTURAL COLLEGE, GUELPH.

We are all aware that there are many insects in our country to-day that were unknown here a few years ago. Even middle-aged men and women of our farming community can well remember the time when there were no Colorado beetles (potato bugs), no cabbage butterflies, no pea weevils, and no San José Scale to worry their minds. The fact is that the majority of our worst insect pests are not native, but have been introduced either from Europe or the United States, many of the latter coming originally from European or other foreign sources. The following very incomplete list of imported insects will make this point clear: Codling moth, cabbage butterfly, currant worm, Hessian fly, wheat midge, clover weevil, both kinds of asparagus beetles, Colorado beetle, horn fly, Buffalo carpet beetle, house cockroach, most of our plant lice or aphides, white fly, oyster-shell and San José scales, and most of our granary pests and meal worms, as they are commonly called.

Of these injurious insects more than three-quarters have come to us from Europe through the United States, though one of the worst, the San José Scale, has been traced back to China. But even in the case of the European importations, it is probable that many of them had their original home in the still earlier civilized portion of the continents of Asia and Africa, whence they spread to Europe and now have come to us.

How, then, has this world-wide distribution of insects been brought about? To answer this fully is impossible, but some of the chief means have been observed. There is no doubt that trans-oceanic insects have been brought to us through the channel of commerce. On nursery stock, especially before the days of compulsory fumigation, were carried from country to country, scale insects, Aphides (both in the egg and in later stages), borers and other orchard insects or their eggs. On greenhouse plants were carried the particular insects that trouble the floriculturist, such as the red spider, mealy bugs, different kinds of Aphides, thrips, etc. In grain and various kinds of seeds and nuts, and in flour or meal, came the various granary and meal pests. On cattle, swine and sheep were brought the different kinds of flies, lice and ticks that infest these animals. In packed fruit were brought the eggs, larvæ, cocoons or adults of many of the fruit-destroying or other pests that frequent the

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orchards where the fruit was packed. In trunks, clothing, etc., were brought house-infesting insects. In fact, whatever insect attacked any particular kind of commodity was almost certain, sooner or later, to be transported with that commodity. We should also remember that ships anchored in a harbour during the time of unloading and loading their cargo form a natural alighting place for the numerous insects that fly around in the air, especially in the warm days and nights of spring and early summer, when the mating season for many is at its height. It is natural to suppose, therefore, that not a few such insects would conceal themselves on board and be carried abroad.

Having thus shown how commerce can convey insects across the ocean, from land to land, let us next consider how we are to account for their wide and rapid spread in any country to which they may chance to have been brought and to have gained a foothold.

We shall first mention some ways in which this is done, independently of man's agency. The first way that would naturally suggest itself is by means of their own powers of locomotion; that is, by flying or crawling from place to place. But in the case of scale insects, which only move about for a day or two in all, and in that time can only traverse a few feet, their spread would be very slow indeed, if they had to trust solely to their own legs to convey them from place to place. Observations have been made, however, which prove that they attach themselves to the bodies of other insects, such as beetles and black ants, and also to the feet and legs of birds, and by these are carried from one tree to another. This would seem the natural explanation of finding, as some of us have, oyster-shell scale on such trees as the red osier dogwood half a mile away from any other infested tree.

A third method of distribution is by means of winds and storms. Gentle and constant winds are of great assistance to insects in enabling them to scent their food at long distances, and, in corroboration of this, it has been observed that they come to their food, in most cases, against the wind. Likewise, a light breeze aids the male insect, by his wonderful sense of smell, to find the female, and thus render the increase of the species more certain. On the other hand, strong winds have often been known to convey such insects as butterflies and moths long distances. Examples of this are the encountering by ships of swarms of butterflies far out at sea, whither they had been driven by the violence of the wind,

and the discovery in Ontario, after three or four days of a strong, steady, southerly wind, of moths, such as the cotton moth, that breed only in the Southern States. Winds, too, often blow young scale insects from the topmost branches of one tree to those of another, or break off infested twigs and leaves and scatter them throughout the orchard. It is worth noting, in this connection, that the strongest and most frequent winds are from the south-west. This fact, to some extent, explains the direction of the spread of our worst insects. It has been observed that, if the San José Scale gets established in the south-west side of an orchard, it will spread over the whole orchard much more rapidly than if it has to begin at the north side and work south.

Closely connected with the action of winds is that of rain storms. These wash many insects from wherever they may happen to be exposed to their fury, and sweep them along, either by themselves or on whatever floating material they may be able to attach themselves to, for long distances in the overflowing rivers and streams, to be cast up at last, still alive in many cases, here and there along the shore.

Some German entomologists, who have made observations on the subject, tell us that the calm, sultry period just before a thunderstorm has a peculiar effect upon insects, causing a strange, nervous sort of activity, and drawing forth from their concealment both sexes. They say, moreover, that Aphides have been observed, during a violent thunderstorm, to crawl to the crown of a plant, and, at the proper moment, launch themselves headlong into the vortex of the storm, to be whirled along possibly for miles.

But, even though these different natural means will account for a gradual and continuous spread of insects, they are far from being the only or even the chief means of distribution. Just as we found that the introduction of transoceanic insects must be attributed to commerce, so also to commerce we must attribute the main part in the rapid spread of insects on land.

Of all the kinds of commerce that have been responsible for the carrying of insect pests from place to place, that in nursery stock has been the chief in the past, before the Government passed a law requiring that such stock should be thoroughly fumigated and disinfected before distribution. It is to nursery stock that we can trace most of the rapid

spread of the oyster-shell, San José and other kinds of scale insects, also of many kinds of Aphides, some borers, and not a few of the other sorts of orchard-infesting insects.

Greenhouses must be held largely responsible for the spread of many small pests, such as the red spider, mealy bug, and Aphides which attack house plants especially. The greenhouse men get these insects on stock received from different sources, and then, by retailing their plants to their numerous patrons, they distribute these troublesome creatures to almost every home in the country. As examples of how easy it is to introduce such insects, and how difficult to get rid of them, may be mentioned the introduction of the chrysanthemum black Aphides, and of the white fly at the Agricultural College, Guelph. Up to three years ago there were no chrysanthemum black Aphides here, but, about that time, Prof. Hunt received some cuttings from one of the United States greenhouses. He examined the cuttings for insects, but so carefully had they concealed themselves, from some cause or other, that he saw none, and supposed the plants free from anything of this sort. A couple of days afterwards, however, when he happened to look at the chrysanthemums he saw many of the black Aphides on them, and, in spite of all his efforts to get rid of the pests, he has hitherto failed to do so. In the case of the white fly, a man living at some distance from Guelph, when on a visit to the college, brought along some leaves of cucumbers to find out what was injuring them. When the Professor had partly opened the parcel, he observed a few tiny insects fly out. He at once closed it tightly and sought to capture the culprits, but in vain. These few escaped individuals have been the progenitors of the numerous white flies that infest many plants around the college greenhouse. Such are merely two examples of many similar ones that every floriculturist could give from his own experience.

Another extensive means of distributing insects is by shipments of fruit. In these times of cold storage and rapid transit, fruit can be conveyed across the continent in a very few days, and whatever insects are to be found in it will have a good chance to arrive at their destination uninjured. Anyone who has ever packed apples knows how impossible it is to prevent at least a few of those infested by codling moth larvæ or other insects being sent in each shipment. The fact is that there is always a possibility of some individuals, of whatever species of insects infest the orchard, getting into the fruit boxes or barrels and escaping uninjured

when the shipments reach their journey's end. This is doubtless the chief means of the distribution of the codling moth which has been so destructive this summer. The larvæ of these, being inside the shipped apples or pears, work their way out from cocoons in the corners or crevices of the boxes or barrels, and, when the fruit has been distributed, these are overlooked and so have a chance to come to maturity, and to emerge in due time and establish themselves in the neighbouring orchards.

Every farmer knows how easy it is to ship pea weevils in seed peas, and so will readily understand that all beetles or moths that infest grain of any sort, flour or meal could easily be distributed in a similar way. That this is the chief means of the wide spreading of such insects there is no doubt.

In connection with commerce, we might also mention, in passing, that it is very probable that great international exhibitions, such as those held in Chicago and Paris, are important factors in the spread of insects, but that any very serious pest has been introduced in this way does not seem to have been proved. Provincial and other exhibitions or fairs also act as distributors, but on a much more limited scale.

Sufficient has now been said to show how very important commerce is as a means of insect distribution. There still remain a few factors that require to be taken into consideration.

If we think over the question we shall find it but natural that in a new country like Canada or the United States, where much land is being brought under cultivation for the first time each year, insect spread should be more noticeable than in older countries, where there are no virgin lands to break up. By this opening up of new districts the balance between insect and plant life is broken. The plants that the insects lived upon are destroyed, and, consequently, the latter are forced to adapt themselves, wherever possible, to the new sources of food provided by the farmer's crops, usually, of course, attacking plants of the same order as those which they had been accustomed to feed upon. Thus a once harmless insect has gradually, or even suddenly in a few cases, changed into an injurious one. This is what happened in the case of the Colorado beetle.

It has, moreover, been found that foreign insects brought into North America become, in most cases, more destructive, and increase more rapidly, than in their native land. There are probably several reasons for this. In the first place, the climate of much of this continent is very favourable to insects. In the second place, our plants, when first attacked

by imported insects, have not had time to acquire that degree of immunity which nature has enabled them gradually to acquire against older and familiar foes; consequently they become an easier prey to these new enemies. In the last place, the parasites and other predaceous insects that kept these pests in control in their native land very often fail to be introduced along with their hosts.

We shall pass on now to the last part of our subject, namely, the intentional introduction by man of beneficial insects to help him in his struggle against the injurious ones. The subject of parasitic insects is attracting a great deal of attention to-day, but is by no means a new subject. We find that for a good many years efforts have been made by entomologists to discover what were the particular parasites that controlled destructive insects in their native countries, and to introduce such parasites to keep in check these same insects when imported. In this way ever year new species of parasites are brought from Australia, New Zealand, Europe, Asia and Africa, to the United States, and *vice versa*. Though most of these have disappointed the too sanguine expectations of their importers, yet several have proved of great service. Of these, two stand out pre-eminently, namely, *Vedalia cardinalis* and *Scutellista cyanea*. The former is a species of ladybird beetle introduced from Australia to combat the white scale that was destroying the orange trees of California, the latter is an insect from South Africa meant to combat the black scale. Both have worked wonders in controlling the ravages of these respective pests. We have, of course, in our own country, many native species of parasites or predaceous insects, such as several kinds of ladybird beetles, Ichneumon flies, Aphis lions, etc. These are distributed throughout the country, either along with their host insects, or in similar ways to those mentioned above.

Though this subject of insect distribution is far from being exhausted by what has been said, it is yet hoped that the different points dwelt upon may awaken a new interest in insects and the insect world among those who, though not trained entomologists, are yet lovers of nature in her different phases. It may interest such to mention that with the marvellous increase of commerce between all countries of the globe, and the bringing of continent into close contact with continent, by the ever-increasing speed of ocean vessels, the time appears to be rapidly approaching when practically all insects will, so far as climate will permit, become cosmopolitan.

A REVIEW OF OUR GEOMETRID CLASSIFICATION.—No. 3.

RICHARD F. PEARSALL, BROOKLYN, N. Y.

The endeavour to place our species under genera based upon structural characters, easily observed, yet possessing stability, has resolved itself into an extensive study and rearrangement of the species themselves, especially of the type forms, which in a number of cases are found to differ from the generic requirements. I need not rehearse here the opinions set forth by Mr. Meyrick, Dr. Hulst and others as to the propriety of using certain characters, whether sexual or not, in defining genera. I have simply, through my own investigations, sought to determine upon the value of those which in our fauna I have tested and found to be reliable, and these I intend to use in future descriptive work, dividing them into *basic* and *auxiliary* groups.

BASIC GROUP.

In this group the characters do not vary as between individuals, except in rarely aberrant forms, which will be noted.

The antenna. They may be filiform, flattened (\cap), compressed (∇), unipectinate, bipectinate, serrate, lamellate, or dentate, and smooth, ciliate, fasciculate, or spinose. They generally differ between sexes of the same species.

The palpi vary in length of joints often between sexes of the same species, but not between individuals of the same sex. Their position is not given, since it is not always natural after death. The comparative terms used to describe them may be thus limited as nearly as is possible:

Short, when looking downward vertically their tips are not, or are just visible beyond the front.

Moderate, when they project beyond the front equal to the width of it between the orbits.

Long, when they exceed that limit.

The frontal tubercles and tufts.

The tongue.

The claws on fore tibiae.

Veins 5 and 8 of hind wings, the former by its presence or absence, the latter by its connection with or separation from the discal cell, are important divisors of families, as well as genera.

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The frenulum.

The tibial spurs.

The hair pencil on hind tibiae of male. Dr. Hulst used this as a reliable factor, and my experience fully warrants the value he placed upon it.

AUXILIARY GROUP.

The characters here classed are not to be wholly relied upon. Many of them will be used as useful aids, but will be omitted where found too unstable.

The tufts of thorax, abdomen, and patagia, chiefly because of their liability to removal by abrasion. The same might seem applicable to the hair pencil, but in only one genus (*Epimecis*) have I had any difficulty with it.

Venation (except veins 5 and 8 of hind wings).

The foveal gland beneath wings. In some *Ennominae* it is well developed, in others difficult of detection, or absent, and thus falls without the pale of fixed characters, but is useful in defining certain genera.

The accessory cell. The extensive use which has been made of the accessory cell by Dr. Hulst in the separation of *Geometrid* genera, following the assertion of Mr. Meyrick that it was an invariable structure, seems not to be warranted, at least so far as the American fauna is concerned. Selecting species in which I have considerable material, I give the result of an investigation, which it was not necessary to extend because here is enough evidence to effectually debar its future use. Of *Cladara atroliturata*, Walk., which, according to Hulst, should have two acc'y cells, out of 58 examples tested, 56 were normal and *two* had only one cell. Of *Nyctobia limitaria*, Walk., 158 examples divided as follows: 28 had one cell, 21 had *one* cell in one wing and *two* in the other, while 109 were normal. Of *Tephroclystia latipennis*, Hulst, with one acc'y cell, 16 examples separated thus: 9 with *one* cell, 7 with *two* cells. Here the anomaly is shown, viz.: 9 specimens with one cell would go into the genus *Tephroclystia*, while the other 7 of the same species would fall into *Eucymatoge*, an impossible situation, hence I have abandoned its use almost entirely, and by so doing it becomes imperative that there be a rearrangement of the genera and species of *Hydriomeninae*.

(To be continued.)

NEW SPECIES OF NORTH AMERICAN LEPIDOPTERA.

BY WM. BARNES, S.B., M.D., DECATUR, ILLINOIS.

(Continued from page 68.)

Grotella calora, n. sp.

Beneath, fore wing quite uniformly fuscous. A small obscure blotch on costa before apex. Hind wing smoky, paler inwardly, centre dark. Mesial band common to both wings. Pale discal mark on hind wing. Face brownish. Head and thorax white. Abdomen concolorous with hind wing.

Types Redington, Ariz.

This species is much smaller than *septempunctata*, with outer row of spots farther out. These together with the dark secondaries will easily serve to distinguish it. The black points in this species are usually quite small and show a tendency to disappear.

Specimens from Argus Mts., which I take to be the same species, show in some specimens an almost entire disappearance of the spots.

Grotella sampita, n. sp.—Expanse, ♂ 22 mm., ♀ 24 mm.

Fore wing chalky white, with black spot on costa at base, with a second one just below it. Black spot on costa at junction of inner and middle third, another one on inner margin opposite to it, a third in middle of wing, internal to the other two. Second row of black spots across wing at end of cell, the row being slightly outcurved and composed of four spots, one on costa, the second slightly below it, one on inner margin, the second slightly above it. This band begins at about the junction of middle and outer thirds of costa. A well-marked row of intervenular terminal black points. Fringe white. Secondaries pale fuscous, almost white along inner margin. Faint discal bar. Fringe white, with well-marked row of black points at base. Face black. Head and thorax white, the latter slightly creamy.

Beneath, fore wings evenly fuscous. Fringe white with fuscous spots at base. Hind wing white, with distinct discal dot, with rather broad fuscous band along costa. Terminal fuscous broken line at base of fringe.

Types ♂ and ♀, Colorado and Southern Arizona.

Grotella binda, n. sp.—Expanse, ♀ 24 mm., ♂ 20 mm.

Ground colour white, with very faint yellowish tinge. Black dot on shoulder and one on costa at base. T. a. line represented by a row of

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black spots, irregular in size and shape, usually about four in number, the one on costa somewhat larger than the others, the third one club shaped. A spot on costa in middle of wing and one at end of cell. T. p. line represented by a row of spots, irregular in shape and size, outwardly curved beyond cell, thence somewhat inwardly curved to inner margin. The spot on costa is considerably larger than the others and close to it on outer side is another similar in shape and size, with some black scales below it. A well-defined black terminal band evenly and neatly cut by pale at end of veins. Fringe slightly darkened. Hind wing soiled whitish fuscous towards apex, narrowing out as it approaches inner margin. In the female the whole wing is slightly darkened with fuscous. Fringe white.

Beneath, fore wing yellowish fuscous, white along inner margin, narrowly yellowish along costal edge. Yellowish patch at apex, followed by a rather narrow yellowish subterminal band. Terminal black band as above, cut with yellow. Hind wing white, with broad even yellow band along costal edge. Face slightly yellowish. Head and thorax whitish.

Type ♂ and ♀, Santa Catalina and Chiricahua Mts., Ariz.

Stibadium olvello, n. sp.—♀. Expanse 28 mm.

Fore wing, light and dark shades of olive brown, the median portion of wing darker, the costal and beyond s. t. line paler. The usual preapical triangular patch of the same shade as the median portion of wing. Three silvery white marks, as follows: first, a small spot at inner portion below costa, second, a large subquadangular patch just beyond that in centre of wing, with a small sharp inward projection at the inner side. The patch occupies about one-half the width of the wing at the inner third. The third patch is external to and above the second at the end of cell, is crescentic in shape, with the concavity upwards. S. t. line rather paler than ground color, with rather sharp angular curve beyond cell, thence quite even to inner margin, following line of outer margin. Fringe concolorous with a slightly darker basal and somewhat lighter mesial band. Hind wing white, with a very faint yellowish tinge and slightly shaded with olivaceous along outer margin. Fringe concolorous with basal portion. A very slight trace of discal bar.

Beneath, fore wing darker centrally, slightly paler along costal, external and inner margins. Fringe darker. The silvery spots from above are indicated as paler patches beneath. The hollow of the crescent being filled with darker scales than any other portion of the wing. Hind

wing pale, slightly stained along inner and outer margins. Head, collar and thorax concolorous with fore wing. Abdomen more yellowish.

Type one ♀, Southern New Mexico, September 1st, from Mr. Poling.

Plusiodonta amado, n. sp.—Expanse 25 mm.

Ground colour grayish brown, with a slight violaceous tinge, shadings from dark yellowish brown to brassy yellow. A dentate line across base of wing, irregular, broken, shaded with deep brown internally. T. a. line strongly toothed, teeth filled with dark brown externally, internally with golden yellow or brassy yellow shading. The space between basal and t. a. line shaded with brown centrally, the upper portion mostly covered with brassy yellow scales not quite so metallic as those in *compressipalpis*. The brown shading following t. a. line is separated sharply from the violaceous central portion of wing, which runs down into the tooth on inner margin. The outer portion of the violaceous area is limited by a brownish line with a marked rounded outward projection in centre of wing; it starts some two or three mm. before apex and terminates just beyond tooth on inner margin, it is accompanied on the outer side by a second brown line parallel to it through upper two-thirds of wing, but which diverges towards inner angle in lower third. The space between the lines is more or less thickly coated with brownish scales. Beyond the t. p. line there is a yellowish brown shade, rather narrow in upper two-thirds of wing, thence broadening out to inner angle. The terminal space is violaceous, with a dark brown patch just below apex. A terminal row of brownish bars between veins, fringe concolorous with terminal area. The reniform can be made out as an indefinite pale ring with darker centre. Hind wing fuscous, fringe concolorous, with darker broken line at base.

Beneath, wings pale yellowish brown, fore wing darkened centrally. Indications of mesial band. Hind wings somewhat more yellowish along costa, with faint traces of mesial band. Head and thorax coated with an admixture of violaceous and brown scales. Abdomen concolorous with hind wing.

Type one ♀, Babiquivera Mts., Ariz., August.

Cirrhophanus papago, n. sp.—Expanse 28 mm.

Fore wings yellow, with orange yellow markings, veins darkened. T. a. line well marked, rather broad, with well-marked outward curve. T. p. line outwardly curved beyond cell, thence with gentle inward curve to inner margin. Fringe concolorous. Hind wings fuscous over yellow

in superior half, inner half more yellowish, fringe yellowish. Head, collar and thorax orange yellow. Abdomen more brownish yellow.

Beneath, fore wings blackish centrally, yellow along costa, inner margin, and more broadly so along outer margin. Hind wings paler yellow.

Types ♂ and ♀, Southern New Mexico, September, from Mr. Poling. *Ogdoconta moreno*, n. sp.—Expanse 28 mm.

Ground colour a rather pale olive over a whitish base. Basal line faintly indicated on costa. T a. line pale, accompanied by outer darker shade, almost transverse, with a slight outward curve. T. p. almost directly across wing at junction of outer and middle third, following outer border, pale with an accompanying inner dark line. S. t. pale, irregular. Terminal row of intravenular lunules, not very distinct. Fringe a trifle paler than ground colour. Rather poorly defined pale spots mark the position of the orbicular and reniform. The median space is a trifle darker than the subterminal and terminal. Hind wing pale fuscous, darkening outwardly, fringe paler.

Beneath, fore wings fuscous centrally, paler beyond the rather faint mesial band. Hind wing paler than fore, somewhat darkened along costa and outer third. Well marked mesial band, extending almost across the wing. Head and thorax concolorous with fore wings, abdomen with hind wings.

Types ♂ and ♀, Babaquivera, Huachuca and Chiricahua Mts., Ariz., August.

Erastria ondo, n. sp.—♂. Expanse 26 mm.

Ground colour a pale brown, with slight yellowish tinge. Fore wings crossed by three lines, the first from costa somewhat before middle to inner margin at junction of inner and middle thirds, with short acute angle at costa, even and rigid through rest of course, somewhat darker shade than ground colour and accompanied by a slightly paler outer shade. Second line sub-parallel to first, beginning just before apex, reaching inner margin at junction of middle and outer third, brown, with outer pale accompanying shade. The third which represents the s. t. line, pale, somewhat wavy, following outer margin. Dark points on veins terminally. Fringe concolorous, with pale line at base. Reniform represented by a few blackish scales. Hind wing pale yellowish fuscous, with slightly darker terminal line. Fringe concolorous. Head and collar yellowish brown. Thorax and patagia somewhat paler. Abdomen yellowish fuscous.

Beneath, fore wing fuscous centrally, yellowish along costal and outer margin. Hind wing whitish centrally, yellowish along costal and outer margin, with faint discal spot and mesial band.

Type, Huachuca Mts., Ariz.

Isogona acuna, n. sp.—Expanse 28 mm.

Ground colour pale brownish yellow. Head and collar dark umber brown. Thorax and abdomen concolorous with wings. Ordinary markings rather faint lines running same as in other species of the genus. T. a. line with inward tooth on cell, thence inwardly oblique to inner margin. Median shade very faint. T. p. slightly wavy towards inner margin, angled opposite cell as in other species. The projection from angle to apex faint though traceable. S. t. line pale, irregular, barely traceable, except towards costa. A few blackish scales on inner margin in subterminal space and a black point above them. The apical triangle only slightly darkened. Reniform moderate in size, concolorous, with narrow defining, slightly darker ring. Orbicular scarcely to be distinguished in the specimens before me. Fringe slightly darker than wing, with dark line at base, followed by a slightly paler one. Hind wing concolorous with fore or a trifle paler. Well marked dark mesial band, followed by more or less evident dusky shade.

Beneath, fore wings uniform even pale brownish yellow, with no traces whatever of any marking.

Type, Babaquivera Mts., August, Redington, Ariz.

Isogona segura, n. sp.—Expanse 28 mm.

Wing form and general type of maculation same as *natatrix*. The colour has, however, somewhat more of a reddish cast. The t. a. line, instead of being even and rigid, is dentate, having three well-marked teeth. Orbicular a well marked black point, smaller and blacker than in its ally. Median shade and reniform about the same in the two species. The triangular patch on costa, before apex, considerably darker brown than rest of wing. T. p. line and spur running to apex, not quite so heavy. The crenulate subterminal line and pale line at base of fringe about the same, as is also the minute black point before inner angle. The space beyond t. p. line somewhat darker than rest of wing. The wing is also darkened somewhat in the angle of t. p. line. Hind wing concolorous with fore. Mesial band not quite so well marked as in *natatrix*. A broad dark shade following mesial line. Palpi, head and collar dark blackish brown. Thorax and abdomen concolorous with wing. Beneath,

rather uniform pale yellowish brown, with very faint traces of common mesial band.

This species can be recognized at a glance from *natrix* by the strongly dentate t. a. line, from *Parora Texana*, with which it has been confused, by the character of t. p. line and reniform. In *segura* the t. p. line is even as in *natrix*, not crenulate and wavy as in *Texana*.

Types, Babaquivera Mts., Ariz., July.

Eudela helveta, n. sp.—Expanse 18 mm.

Head, thorax and wings yellow as in *mendica*. Fore wing with broad, semi-transparent fascia, almost reaching costa before apex and inner margin before inner angle. The margins are quite even. A large semi-transparent patch in base of cell, with another about twice as large below it, only separated by vein. Hind wing with broad semi-transparent fascia occupying about one-third of the wing. Under surface as above.

Types, two ♂, Kerrville, Texas.

RECORDS OF DIPTERA FROM LAKE TEMAGAMI, ONT.

BY JAMES S. HINE, COLUMBUS, OHIO.

Mr. Frank B. Shuler, of Hamilton, Ohio, while with a camping party on Lake Temagami, Ontario, during the past summer, collected a number of species of Diptera, some of which are worthy of note as matters of record.

Of most interest is the discovery of a second species of the genus *Mesembrina* for North America. It agrees so well with the European *M. mystacea* that I have given it that name.

The nearctic species of this genus have not received much consideration, but Hough has given a short account of the results of his studies in Vol. I of the Biological Bulletin. He is of the opinion that we have only a single species of the genus, and this he determines as *M. Latreillei*, of which he makes *resplendens* a synonym.

The specimen I have called *mystacea* is larger than *Latreillei*, fully 15 millimetres in length and quite robust, the thorax is clothed above with golden-yellow pile, and so are the last two segments of the abdomen, but on the latter the colour is lighter than on the former. The apical cell of the wing is not so widely open, and the sides of the face are yellow instead of silvery. Some of the older authors placed *mystacea* in the Syrphidae, and I must confess the specimen before me looks very much

like one of those flies from superficial examination. In fact, I took it for a Syrphid myself until I examined the wing venation.

The following species are represented in the collection :—

TABANIDÆ.

Tabanus actaeon, *astutus*, *epistatus*, *microcephalus* and *nivosus* ;
Chrysops excitans and *frigidus*.

BOMBYLIIDÆ.

Anthrax alternata, *fulviana* and *lateralis*.

SYRPHIDÆ.

Syrphus arcuatus, *diversipes*, *ribesii* and *xanthostoma* ; *Xanthogramma felix* ; *Sphaerophoria cylindrica* ; *Eristalis dimidiatus* ; *Helophilus latifrons* and *similis* ; *Xylota fraudulosa*.

CONOPIDÆ.

Physocephala furcillata.

TACHINIDÆ.

Gonia capitata ; *Echinomyia algens* ; *Panzeria radicum*.

DEXIDÆ.

Ptilodexia tibialis.

SARCOPHAGIDÆ.

Lucilia Cæsar.

MUSCIDÆ.

Mesembrina mystacea.

ON THE CORNICLES OF THE APHIDÆ.

BY J. R. DE LA TORRE BUENO, NEW YORK.

Among the many interesting matters discussed at the New York meeting of the Association of Economic Entomologists, the question of the source of the so-called honey-dew of the Aphides was touched upon by some of the members present, and doubts were freely expressed as to its being ejected at the cornicles, although so stated in the majority of works. By a curious coincidence, I received, from Professor Geza von Horvath, of Buda-Pesth, a separate of a paper he published, in 1905, on the matter, (*Sur les cornicules ou nectaires des Aphidien*, C. R. 6me. Congr. intern. de Zool.), of which what follows is an abstract.

The learned Hungarian briefly mentions the nature, position and dimensions of the tubes, and then proceeds to review the opinions of Reaumur, Bonnet, Linné, to whose great authority he attributes the prev-

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alence of the notion that the Aphides eject the honey-dew through the cornicles; Kyber, Kaltenbach, Forel and others, who held to the views of Bonnet.

It can, however, be easily ascertained that the honey-dew is excreted exclusively through the anus and never by the cornicles. When an ant strokes an Aphis with its antennæ, a clear drop appears, always at the end of the abdomen, whilst the cornicles excrete nothing. On the other hand, if an Aphis be picked up in the fingers, or if it be touched with a straw, a tiny drop at once appears at one or both cornicles, which is always coloured.

Certain authors have held that these appendages formed part of the respiratory system, a theory clearly erroneous. Wiltaczil has even thought that they appertained to the urinary system, but, on the one hand, the product of the basal glands of the cornicles does not show any of the uric acid reactions; and, on the other hand, Kowalevsky has demonstrated that in the Aphides the end of the intestine is functional as an urinary organ in the absence of the Malpighian tubes. Professor Knor's analysis, published by Büsgen, proved that the viscous liquid excreted through the cornicles is a waxy substance.

"In order to understand the object of this waxy matter, one should observe a colony of living Aphides. It can then be seen that the colony rids itself of its excreta through the anus in the form of clear drops, especially when they are stroked by their friends the ants; during this operation their cornicles are quiescent and inactive and show no change. But if an aphidophagus insect, particularly a Coccinellid or the larva of a Chrysopa, approaches a plant louse, the latter puts out at the tip of one or the other cornicle a tiny viscous drop, aims the cornicle towards its enemy and endeavours to apply the drop to the head, the jaws or the thorax. If this manœuvre is successful, the enemy retires at once and does all it can to rid itself of the adherent drop, which dries at once, and which is apparently extremely disagreeable to it." Hence Dr. Horvath defines the cornicles thus:

"The cornicles of the Aphides are the excretory canals of wax-producing glands differentiated in a special manner, and the product of which is a means of defence against the Coccinellidæ and the Chrysopidæ."

Those unfurnished with cornicles do not need this protection, since some live underground and others are covered with a waxy secretion. There are few Aphides unprovided with either of these means of defence.

NOTE ON PLATAEA CALIFORNIARIA, HERR-SCH., AND ITS ALLIES.

BY GEO. W. TAYLOR, WELLINGTON, B. C.

Two species appear to be confused in our recent lists under the name *P. Californiaria*. The one species is properly entitled to the name, the other is the *Gorytodes uncanaria* of Guenée.

Packard in one of his early papers¹ describes *uncanaria* from Californian specimens, but amongst them he had evidently a specimen of *Californiaria*, for that is the insect he figures in the photographic plate² accompanying the article.

In the course of his description, too, he makes occasional reference to differences shown by certain specimens, which are just the differences that are seen in comparing the two forms.

In the monograph³ the same confusion exists. The description is mainly *uncanaria*, while the figure is *Californiaria*.

In this work *Californiaria* is placed as a synonym of *uncanaria*, although it is really the prior name.

Henry Edwards⁴ was the first to point out the fact that we have two species here, but he, taking it for granted, I suppose, that *uncanaria* properly included *Californiaria*, Herr-Sch., renamed the latter form *personaria*. He points out the differences very clearly, and they can be readily seen if the two species are placed side by side.

In *Californiaria* (= *personaria*) the intra-discal line runs from the costa to the base of vein 2 before turning towards the inner margin. In *uncanaria* it runs in a straight line to the base of vein 3. In the first named the discal spot on the fore wing is black, in *uncanaria* it is black pupilled with a lighter shade; and in the third place in *Californiaria* the median band is much narrower on the costa and much more deeply toothed on its outer edge than the corresponding band in *uncanaria*.

A third species belonging to the same group in the genus is *P. diva*, Hulst. This agrees in wing shape with *uncanaria*, but is very different in colour, being (if I have rightly identified my specimen from Hulst's description) a very dark gray, with a much more regularly scalloped extra-discal line than has *uncanaria*, and with the dark submarginal shade on

(1) Proc. Bost., Soc. Nat. Hist., XVI, 221.

(2) Plate I, fig. 24.

(3) Page 201, pl. IX, fig. 32.

(4) Papilio, vol. 1, p. 120.

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the fore wing *following* the faint submarginal white line instead of preceding it as it does in both *uncanaria* and *Californiaria*.

Our species should stand as follows:

- (1) *Plataea Californiaria*, Herr.-Sch.
= *personaria*, Hy. Edw.
- (2) *P. uncanaria*, Guenée.
- (3) *P. diva*, Hulst.
- (4) *P. trilinearia*, Packard.
= ? *dulcearia*, Grote.

Californiaria seems to be widely distributed in the State, and to be common in April and May.

Uncanaria is not so common. My specimens were taken in Sonoma County in May.

Diva is rare in collections. The type was from the Argus Mountains (Riley), and my own specimen was received from Mr. F. Grinnell, who took it on the San Bernardino mountains, at an elevation of 8,500 feet.

Trilinearia is the most abundant form. Dyar's list gives Texas, Colorado, Arizona and Nevada as localities, and I can add to these California, Kansas, British Columbia and Alberta.

Dulcearia, Grote, is placed by Hulst as a synonym of *trilinearia*, and probably quite rightly. Grote, however, says that the two can readily be distinguished, and I must say I have never seen a specimen quite agreeing with Grote's diagnosis. Possibly Grote may have been misled by the very faulty figure in Monograph.

The *Cleora demorsaria* of Strecker,⁵ which is placed in the genus *Plataea* by Hulst, is said by Dr. Dyar to be based on a specimen of *Spodolepis substriataria*.

A NEW CANADIAN SPECIES OF COPIDOSOMA.

BY L. O. HOWARD, WASHINGTON, D. C.

The little Chalcidid parasites of Lepidopterous larvæ belonging to the genera *Copidosoma*, *Litomastix* and *Ageniaspis*, are of especial interest at this time, on account of the extraordinary discoveries in the development of these forms that have been made by Marchal and Silvestri. Mr. H. H. Lyman some time ago rearing a number of specimens of one of these insects from the larvæ of *Anacamptis lupinella*, Busck, taken on a species of *Lupinus* at Toronto, sent the reared specimens to the Depart-

(5) *Lep. Rhop. Het.*, suppl. 2, p. 9.
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ment of Agriculture, at Washington, and Doctor Ashmead gave them the manuscript name of *Copidosoma Lymani*, n. sp. Dr. Ashmead's sad and serious illness has stopped his work surely for a long time to come, and, at Mr. Lyman's request, I have described the new form, and submit the description as follows :

Copidosoma Lymani, n. sp.—Female. Length, 0.92 mm.; expanse, 2.1 mm.; antennæ inserted quite at the mouth corner; cheeks about as long as the eyes; vertex slightly rounded above eyes; front well rounded. Facial depression beginning opposite lower third of eye, and continuing somewhat divergently to mouth border; a median carina beginning dorsad with a smooth, elevated tubercle, which is not distinct on its ventral aspect, and widening slightly towards mouth border. First funicle joint one-third length of pedicel and narrower; other funicle joints gradually increasing in length and extremely gradually in width. Face and notum, including tegulæ, finely shagreened; mesopleura faintly striate. Head and mesonotum metallic bluish-green; mesoscutum brown, with brownish metallic reflections; mesopleura dark metallic purplish, brownish and bronzy caudally; antennal scape, dark brown, lighter at extremities; flagellum dark honey-yellow, darker at joints; abdomen shining black; all femora brown; front tibiæ and all tarsi light yellowish; middle tibiæ brown near base; hind tibiæ with basal half brown.

Described from nine specimens. Host, *Anacamptis lupinella*. Habitat, Toronto, Canada. Collector and breeder, H. H. Lyman. Type No. 9779, U. S. National Museum.

CHIONEA VALGA IN MINNESOTA.

On page 275, August, 1906, CAN. ENT., is an article from C. N. Ainslie, of Rochester, Minn., somewhat discrediting the finding of *Chionea valga* in Minnesota previous to his finding it in December, 1905.

I am just in receipt of a letter from Prof. J. M. Aldrich, in which he says that he has in his collection a specimen of this insect with Dr. Lugger's label on it. Further, that he distinctly remembers seeing, in Lugger's collection, in 1888, at least two more specimens of this insect. It would seem, then, that Dr. Lugger was justified in figuring it in his Second Annual Report, and that it was found in Minnesota previous to 1905.

In making up our report for 1905 on the Diptera of Minnesota, we used a figure found among the cuts here, drawn by Miss Housenstein, which Dr. Lugger evidently intended to use had he lived to carry out his plans.—F. L. WASHBURN, State Entomologist, St. Anthony Park, Minn.

THE OCCURRENCE OF *ACHLARUS LYCIDAS* AND *LAERTIAS PHILENOR* NEAR BOSTON, MASS.

During the three years prior to 1904, I collected very frequently in the Middlesex Fells Reservation, which includes parts of Malden, Melrose, Medford, and Stoneham. I found *A. lycidas* quite common, and in company with *Epargyreus tityrus*, on red clover blossoms at the south side of the Fells Reservoir and along the driveways near it. The single remaining specimen of my captures from this locality is dated June 17, 1902. I do not remember taking it in any other locality, but Mr. J. H. Rogers, Jr., stated at a recent meeting of the Cambridge Entomological Club in Boston, that it was quite common in Medford. Mr. H. H. Newcomb, President of the Club, said that the occurrence of this species in this locality had long been known to Boston entomologists.

While I have probably seen *Laertias philenor* flying, I have never yet taken it in Massachusetts. Mr. W. L. W. Field, in a short article on Varying Abundance of Certain Butterflies, published in *Psyche*, Vol. XII, p. 76, remarks: "*Laertias philenor* appears occasionally in great numbers in the neighbourhood of Boston, but after a season of plentifulness it vanishes."

C. A. FROST, South Framingham, Mass.

Mr. Harris's query as to *Papilio (Laertias) philenor* and *A. lycidas*, on page 68 of the February issue of the *ENTOMOLOGIST*, is just noticed. There is nothing unusual in either of these at Melrose, Mass. *Philenor* has been taken by me at Bar Harbor, Maine; it has been very common for years in the swamps near Greenwich, Conn., and I have twice seen it in the Berkshires. It naturally follows several introduced plants.

While writing, I wish to add Winnetka, Illinois, just north of Chicago, as an unreported locality for *Terias delia* and *Pamphila Aaroni*.

EUGENE MURRAY AARON, Chicago.

BRITISH COLUMBIA BRANCH—ENT. SOC. ONTARIO.

The sixth annual meeting was held in Vancouver on the 25th of January. The election of officers resulted as follows: *President*, Rev. G. W. Taylor; *Vice-President*, Mr. A. S. Bush; *Secretary-Treasurer*, Mr. R. V. Harvey.

Mr. Harvey reviewed the work of the past year, and pointed out the value of the "Bulletin" as a permanent record of that work. He referred to the difficulty encountered by members in having their Hymenoptera and Coleoptera determined, and suggested that an effort should be made this season to obtain a more complete knowledge of local Coleoptera. He also asked for more hearty co-operation in keeping up the Bulletin.

A discussion on labels followed, and it was recommended that green paper be used for all Vancouver Island labels, and rose-colour for Vancouver city and neighbourhood. Mr. Bryant described his collecting experiences on the Stikine and Taku rivers. A spring meeting will be held at Duncan's about April 10th.

Mailed March 7th, 1907.

